

Remarks

In view of the following remarks, favorable reconsideration of the outstanding office action is respectfully requested. Claims 1 – 58 remain in this application. Claims 54 – 58 have previously been withdrawn from consideration, without prejudice.

1. Election/Restriction

In Office Action Paper No. 8 the Examiner Restricted the claims into two groups: Group I, including claims 1 – 53, and Group II, including claims 54 – 58. In response to the Restriction Requirement the Applicants elected Group I, which, based on the Examiner's Restriction Requirement, should include claims 1 – 53. However, in the most recent Office Action Paper No. 10, the Examiner states that claims 7 – 11, 13, and 28 – 38 were not elected. Applicants believe that this is erroneous since the Applicant elected the entire Group I. Further, because claims 7 – 11, 13, and 28 – 38 are dependent from independent generic claims, they include all of the subject matter of these generic claims. Thus, these claims must be directed to the same invention. As such, a further restriction of 7 – 11, 13, and 28 – 38 from Group I is improper.

Accordingly, the Applicants respectfully request a clarification on this point. Applicants also respectfully traverse this point and assert that 7 – 11, 13, and 28 – 38 are part of Group I as originally determined by the Examiner in Office Action Paper No. 8.

2. § 103 Rejections

A. The Examiner has rejected claims 1 – 4, 12, 14 – 25, and 39 – 53 under 35 U.S.C. § 103 as being unpatentable for obviousness over U.S. Patent Application Publication No. 2002/0085795 to Carr et al. (hereinafter Carr).

Claim 1 is directed to a modular optical switch fabric that includes an optical chassis. At least one optical module is removably coupled to the optical chassis. The at least one optical module includes a collimator panel and a beam steering panel secured to a frame member. The frame member is configured to position the collimator panel in fixed optical alignment relative to the beam steering panel.

Claim 22 is directed to a modular optical switch fabric that includes an optical chassis. A reflective element is attached to the optical chassis. At least one optical module is mechanically coupled to the optical chassis and optically coupled to the mirror. The at least one optical module includes a collimator panel and a beam steering panel secured to a frame

member. The frame member is configured to position the collimator panel in fixed optical alignment relative to the beam steering panel.

Claim 23 is directed to a modular optical switch fabric that includes an optical chassis. At least one pair of optical modules is coupled to the optical chassis. A first optical module of the pair of optical modules is optically coupled to a second optical module of the pair of optical modules. Each optical module includes a collimator panel and a beam steering panel secured to a frame member. The frame member is configured to position the collimator panel in fixed optical alignment relative to the beam steering panel.

Claim 41 is directed to a modular optical switch fabric that includes an optical chassis having a chassis connector. At least one optical module having an optical module connector mates with the chassis connector such that the at least one optical module is removably coupled to the optical chassis. The at least one optical module includes a collimator panel and a beam steering panel secured to a frame member. The frame member is configured to position the collimator panel in fixed optical alignment relative to the beam steering panel.

Claim 42 is directed to a modular optical switch fabric that includes an optical chassis having at least one first chassis connector and at least one second chassis connector. A reflective element is attached to the optical chassis. At least one pair of optical modules includes a first optical module and a second optical module. The first optical module has a first optical module connector mating with the at least one first chassis connector and the second optical module has a second optical module connector mating with the at least one second chassis connector such that the first optical module is optically coupled to the second optical module via the reflective element. Each optical module includes a collimator panel and a beam steering panel secured to a frame member, the frame member is configured to position the collimator panel in fixed optical alignment relative to the beam steering panel.

Claim 43 is directed to an optical module for use in an optical switch fabric. The optical module includes a frame member, a collimator panel secured to the frame member, and a beam steering panel secured to a frame member, such that the collimator panel is in fixed optical alignment relative to the beam steering panel.

Claim 49 is directed to a method for directing a light signal in an optical switch fabric. The optical switch fabric includes an optical chassis. The method includes the step of providing at least one optical module that is removably coupled to the optical chassis. The at least one optical module includes a collimator element and a beam steering element each secured to a frame member. The frame member is configured to position the collimator

element in fixed optical alignment relative to the beam steering element. The light signal is input into the optical module via the collimator element, such that the light signal is automatically directed onto the beam steering element by virtue of the fixed optical alignment provided by the frame.

Claim 53 is directed to a method for directing a light signal in an optical switch fabric. The optical switch fabric includes an optical chassis and a reflective element mounted on the optical chassis. The method includes the step of providing at least one pair of optical modules that are removably coupled to the optical chassis. A first optical module, of the pair of optical modules, is optically coupled to a second optical module of the pair of optical modules via the reflective element. The first optical module includes a first collimator element and a first beam steering element secured to a first frame member. The first frame member is configured to position the collimator element in fixed optical alignment relative to the first beam steering element. The second optical module includes a second collimator element and a second beam steering element secured to a second frame member. The second frame member is configured to position the collimator element in fixed optical alignment relative to the beam steering element. The light signal is directed into the first optical module via the first collimator element, such that the light signal is automatically directed onto the first beam steering element by virtue of the fixed optical alignment provided by the first frame. The light signal is steered from the first beam steering element to the second beam steering element via the reflective element, such that the light signal is automatically directed into the second collimator element by virtue of the fixed optical alignment provided by the second frame.

Carr is directed to an optical switch 30 (Figure 2). The switch is formed by stacking switch modules 10. The switch module is depicted in Figure 1. Each switch module 10 includes a fiber array connector 13, an array of rotatable mirrors 15, and a fixed mirror 16 mounted on a housing 11. Input fibers and output fibers are terminated on fiber connector 13. Rotatable mirrors 15 and fixed mirror 16 are adapted to deflect incoming light beams to one of the output fibers. When a plurality of modules are employed, the modules are positioned so that at least one incoming beam in the first module directed to the first array can be deflected to an array in a second module.

According to the **MPEP 2143**, three basic criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the

art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

i). The prior art references do not teach or suggest all the claim limitations.

Claim 1:

The Examiner asserts that the Carr teaches an optical chassis that can be used to couple on or more optical modules. In support of this assertion, the Examiner points to housing 11 (Figure 1). However, housing 11 cannot be an optical chassis because it is a component of the optical switch module. The fiber connector 13, mirror 16, and rotatable mirrors 15 are mounted on housing 11 (Paragraph 0009). In other words, housing 11 is the optical module frame. Further, housing 11 does not have one or more optical modules "removably coupled" thereto, as recited in claim 1. Instead, housing 11 has optical module components fixedly mounted thereon. Also, Carr does not employ an optical chassis to couple one or more optical modules. Referring to Figure 2, Carr teaches that each optical module in a multi-module embodiment, is stacked one upon the other. Figure 2 clearly shows that Carr does not employ any optical chassis for coupling optical modules 10. Thus, the Examiner has failed to point out where Carr teaches or suggests an optical chassis as recited in claim 1.

Claim 1 also recites at least one optical module that includes a collimator panel and a beam steering panel secured to a frame member. The frame member positions the beam steering panel in fixed optical alignment with the collimator panel. The Examiner admits that Carr does not teach or suggest a collimator panel. As such, housing 11 cannot possibly position a collimator panel in fixed optical alignment with rotatable mirror panel 15, as recited in claim 1. Thus, the Examiner has failed to point out where Carr teaches or suggests at least one optical module that includes a collimator panel and a beam steering panel secured to a frame member, whereby the frame member positions the beam steering panel in fixed optical alignment with the collimator panel, as recited in claim 1.

Accordingly, the Examiner has not made a prima facie case of obviousness because he has failed to point out where the cited reference teaches or suggests all of the limitations of claim 1.

Claim 22:

Applicants respectfully point out that the Examiner has failed to provide an independent analysis of independent claim 22.

The Examiner has failed to point out where Carr teaches or suggests an optical chassis and at least one optical module removably coupled to an optical chassis for the same reasons provided above in the analysis of claim 1. The Examiner also asserts that Carr teaches a reflective element coupled to an optical chassis, as recited in claim 22. In support of this assertion, the Examiner points to mirror 16 which is mounted on housing 11 of optical module 10. As pointed out above, housing 11 is not an optical chassis as recited in the claims. Both housing 11 and mirror 16 are components of the optical module 10. Accordingly, Carr does not teach or suggest a reflective element coupled to an optical chassis.

Accordingly, the Examiner has not made a prima facie case of obviousness because he has failed to point out where the cited reference teaches or suggests all of the limitations of claim 22.

Claim 23:

The Applicants respectfully point out that the Examiner has failed to provide an independent analysis of this claim. Claim 23 recites “at least one pair of optical modules coupled to an optical chassis. The Examiner has failed to point out where Carr teaches or suggests an optical chassis and at least one optical module removably coupled to an optical chassis for the same reasons provided above in the analysis of claim 1. As noted above, the optical modules include a collimator panel and a beam steering panel secured to a frame member. Because there is no independent analysis for this claim, the Examiner has also failed to point out where Carr teaches or suggests that the above described optical modules should be employed in pairs, as recited in claim 23.

Accordingly, the Examiner has not made a prima facie case of obviousness because he has failed to point out where the cited reference teaches or suggests all of the limitations of claim 23.

Claim 41:

Again there is no independent analysis for this claim. However, the Examiner has failed to point out where Carr teaches or suggests an optical chassis and at least one optical module removably coupled to an optical chassis for the same reasons provided above in the analysis of claim 1.

The Examiner makes an oblique reference to this claim by asserting that Carr teaches “at least one optical module having an optical module connector mating with the chassis connector,” which is disposed on the optical chassis. In support of this assertion, the Examiner points to fiber array connector 13, which is depicted in Figure 1. Carr states that “a plurality of optical fibers 12, are mounted to one surface of the housing through a commercially available fiber array connector 13” (Paragraph 9). Accordingly, connector 13 is not employed to mate an optical module with the optical chassis, as asserted by the Examiner.

Accordingly, the Examiner has not made a prima facie case of obviousness because he has failed to point out where the cited reference teaches or suggests all of the limitations of claim 41.

Claim 42:

Again, the Examiner fails to provide an independent examination of this claim. As noted above, claim 42 is directed to a modular optical switch fabric that includes at least one pair of optical modules coupled to an optical chassis. Again, the Examiner has failed to point out where Carr teaches or suggests an optical chassis and a pair of optical modules removably coupled to an optical chassis for the same reasons provided above, in the analysis of claim 1. In that analysis, the Examiner failed to point out where Carr teaches or discloses optical modules that include a collimator panel and a beam steering panel secured to a frame member, the frame member being configured to position the collimator panel in fixed optical alignment relative to the beam steering panel.

The Examiner asserts that the subject matter of claim 42 can be found in paragraph 12 of Carr. However, a careful reading of the cited text reveals that Carr discloses the stackable optical module arrangement shown in Figure 2. As noted above, Carr does not employ any chassis in the stackable arrangement. In particular, the Examiner fails to point out where Carr teaches or discloses an optical chassis having a first chassis connector that mates with a first optical module and a second chassis connector that mates with a second optical module, a reflective element attached to the optical chassis, and at least one pair of optical modules

including a first optical module and a second optical module. The claim also recites that the first optical module has a first optical module connector mating with the at least one first chassis connector and the second optical module has a second optical module connector mating with the at least one second chassis connector such that the first optical module is optically coupled to the second optical module via the reflective element.

Accordingly, the Examiner has not made a prima facie case of obviousness because he has failed to point out where the cited reference teaches or suggests all of the limitations of claim 42.

Claim 43:

The Examiner fails to provide an independent examination of this claim as well. This claim recites an optical module that includes a frame member, a collimator panel, and a beam steering panel. The frame secures the collimator panel and the beam steering panel in a fixed optical alignment one to the other. The Examiner admits that Carr fails to teach or suggest a collimator panel. Because Carr does not include a collimator panel as claimed, Carr cannot possibly teach or suggest a frame that secures a collimator panel and a beam steering panel in a fixed optical alignment one to the other.

Claim 43 illustrates why the Examiner's interpretation of Carr relative to the claimed invention is so problematic. If housing 11 anticipates the claimed optical chassis as the Examiner asserts, then what member of Carr's optical switch module anticipates the frame member recited in the claims? Conversely, if the recited frame element reads on housing 11, then Carr does not teach or suggest an optical chassis.

Accordingly, the Examiner has not made a prima facie case of obviousness because he has failed to point out where the cited reference teaches or suggests all of the limitations of claim 43.

Claim 49:

The Examiner provides no discussion of any of the method steps of claim 49. As noted above, the Examiner has failed to show where Carr teaches or suggests the step of providing at least one optical module removably coupled to an optical chassis, as recited in claim 49. Because the Examiner provides no analysis of this claim, the Examiner has also failed to point out where Carr teaches the subsequent steps of inputting a light signal into the

switch fabric via a collimator element, such that the light signal is automatically directed onto a beam steering element by virtue of a fixed optical alignment provided by a frame.

Accordingly, the Examiner has not made a prima facie case of obviousness because he has failed to point out where the cited reference teaches or suggests all of the limitations of claim 49.

Claim 53:

The Examiner provides no discussion of any of the method steps of claim 53 as well. As noted above, the Examiner has failed to show where Carr teaches or suggests the step of providing at least one optical module removably coupled to an optical chassis. Because the Examiner provides no analysis of this claim, the Examiner has also failed to point out where Carr teaches the subsequent steps of directing a light signal into a first optical module via a first collimator element, steering the light signal from a first beam steering element to a second beam steering element, and directing the light signal into a second collimator element as recited in claim 53.

Accordingly, the Examiner has not made a prima facie case of obviousness because he has failed to point out where the cited reference teaches or suggests all of the limitations of claim 53.

ii). There is no suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference.

On page 4, paragraph two of the Office Action, the Examiner states:

“Although Carr’s disclosure does not explicitly state that the optical module includes a collimator panel in alignment with the beam steering panel, collimating panels in optical switches are very well known means of aligning optical signals. One of ordinary skill in the art would recognize the need/advantage of a collimator panel in any optical switch disclosed in Carr.”

Therefore, the Examiner concludes, “it would be obvious to one of ordinary skill in the art to include a collimator panel for aligning input/output fibers with the beam steering

panel in the switch disclosed by Carr.” In response, the Applicants make several observations that traverse the Examiner’s arguments.

First, the Examiner asserts that “collimating panels in optical switches are very well known means of aligning optical signals.” If they are so well known, why hasn’t the Examiner found a single reference to support this assertion? The Applicants point out that it is improper to modify a reference to include a missing element in an obviousness rejection under 35 U.S.C. § 103(a). As pointed out above, it is well established that a reference, or a combination of references, must teach or suggest all claim limitations in a rejection under 35 U.S.C. § 103(a). See *In re Vaeck*, MPEP 2143. The Examiner is improperly attempting to supply a claim limitation that is missing from the cited prior art by way of this statement.

Second, the Examiner states that “one of ordinary skill in the art would recognize the need/advantage of a collimator panel in any optical switch disclosed in Carr.” As pointed out above, it is well settled that the suggestion or motivation to modify the reference must come from either the references itself, or from the knowledge generally available to one of ordinary skill in the art. However, the Examiner fails to point out where his rationale is supported in either Carr or in some body of knowledge generally available to those skilled in the art. Clearly, Carr does not “recognize the need or advantage” of a collimator panel, otherwise Carr would have disclosed this feature. The Examiner fails to point to any source of knowledge generally available to those of ordinary skill in the art to support his statement.

Third, the Examiner’s statement is technically inaccurate. When a beam of light is directed through a collimator, all of the light rays emitted from the collimator are parallel one to the other. As such, the function of a collimator is not necessarily to align components within an optical device, it is to process the light signal itself. Thus, one of ordinary skill in the art would not be motivated to employ a collimator panel for alignment purposes.

In view of points two and three made above, the Examiner is viewing Carr with impermissible hindsight.

iii). Summary

Accordingly, the Applicants respectfully assert that independent claims 1, 22, 23, 41, 42, 43, 49, and 53 are patentable over Carr. The Examiner has failed to make a prima facie case of obviousness because, as shown in paragraph 2.A.i) above, he has failed to point out where the cited reference teaches or suggests all the claim limitations. The Examiner has also failed to make a prima facie case of obviousness because, as pointed out in paragraph 2.A.ii)

above, he has failed to show any suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the Carr reference.

Claims 2 – 20, 24 – 40, 44 – 48, and 50 – 52 are patentable in their own right. These claims are also allowable by virtue of their dependency from the claim 1, claim 23, claim 43, and claim 49, respectively. Accordingly, claims 1 – 53 are patentable under 35 U.S.C. § 103.

B. The Examiner has rejected claims 5, 6, 26, and 27 under 35 U.S.C. § 103(a) as being unpatentable for obviousness over Carr in view of U.S. Patent Application Publication No. 2002/000122619 to Sandler et al. (hereinafter Sandler).

As noted above, claims 5 and 6 are allowable by virtue of their dependency from claim 1. Claims 26 and 27 are allowable by virtue of their dependency from claim 23. In Section 2.A above, Applicants have shown that Carr does not teach or suggest all the claim limitations of independent claims 1 and 23. The Examiner makes no representation that Sandler remedies the deficiencies of Carr.

Accordingly, claims 5, 6, 26, and 27 are patentable under 35 U.S.C. § 103.

3. Conclusion

Based upon the remarks and papers of record, Applicant believes the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicant respectfully requests reconsideration of the pending claims 1 - 53 and a prompt Notice of Allowance thereon.

Applicant believes that a one-month extension of time is necessary to make this Response timely. Should Applicant be in error, Applicant respectfully requests that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Response timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 50-0289.

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Respectfully submitted,

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